



## Hallam, Nebraska, Decommissioned Reactor Site

### FACT SHEET

*This fact sheet provides information about the Hallam, Nebraska, Decommissioned Reactor site.  
This site is managed by the U.S. Department of Energy Office of Legacy Management.*

### Site Description and History

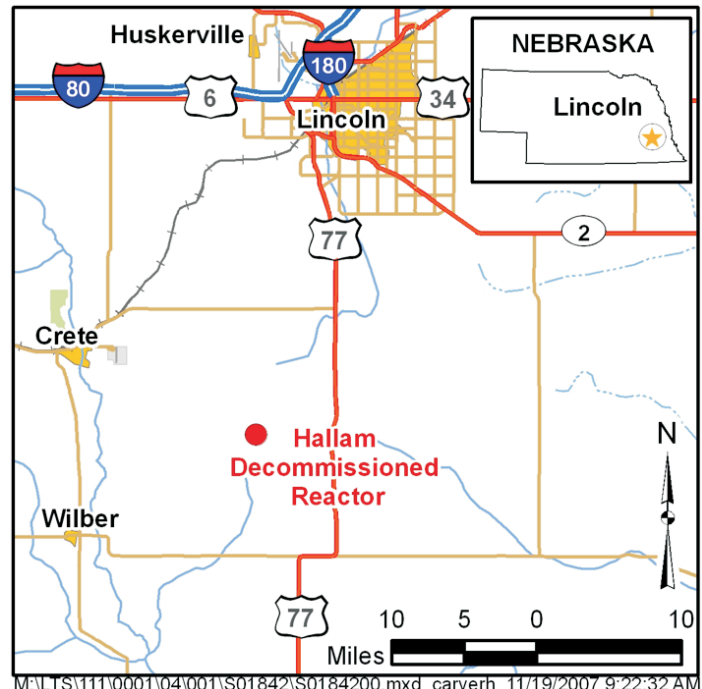
The Hallam Decommissioned Reactor Site is in southeastern Nebraska, approximately 19 miles south of Lincoln. The 18-acre site is located on the 640-acre Sheldon Power Station, a coal-fired power plant owned and operated by the Nebraska Public Power District.

The Hallam nuclear power facility was a 240-megawatt (thermal) sodium-cooled, graphite-moderated nuclear reactor. The U.S. Atomic Energy Commission (AEC), a predecessor agency of the U.S. Department of Energy (DOE), operated the reactor from 1962 to 1964 as part of AEC's Power Demonstration Program. The reactor had fulfilled its objectives by 1966, and the Nebraska Public Power District decommissioned and dismantled the reactor facility between 1967 and 1969.

### Facility Decommissioning

The original reactor facility operated in a massive, reinforced concrete building. Except for the concrete structure that housed the intermediate heat exchanger, the aboveground portion of the facility was razed during decommissioning, and all aboveground components of the reactor were removed and decontaminated or disposed of. All bulk sodium and most of the below-ground radioactive materials were removed from the site; some radioactive materials were entombed in place. Residual sodium was reacted with steam to form sodium hydroxide to prevent formation of hydrogen if water were to enter the structure.

Contaminants remaining at the site are contained in three areas of the belowground portion of the reactor building: Area 1 (reactor vessel and vessel containment structures), Area 2 (Fuel Storage Pit 3 thimbles), and Area 3 (moderator element storage cells). Each of these areas is steel-lined and surrounded by several feet of concrete and other structural materials that provided shielding when the facility was operating. Contamination remaining in these areas consists mainly of activation products—materials that were formerly stable but became radioactive after being bombarded with high



*Location of the Hallam Decommissioned Reactor*

levels of radioactivity in the reactor core. These contaminants consist primarily of cesium-137, cobalt-60, iron-55, manganese-54, nickel-63, samarium-151, strontium-90, and tritium (a radioactive isotope of hydrogen).

About 300,000 curies of radioactive material was entombed at the time of closure. This material was calculated to decay to about 15,000 curies by the year 2000.

All access points to the below grade portion of the facility and the Intermediate Heat Exchanger Building were sealed off by welded steel closures and reinforced expanding concrete. The Intermediate Heat Exchanger Building was coated with a layer of polyvinyl sheeting on all exterior surfaces, and a protective concrete cover was added. The concrete ceiling of the belowground portion of the reactor building was weatherproofed by covering with sand, a polyvinyl membrane, and soil.

This cover forms a roughly rectangular, 1.4-acre, flat-topped, grass-covered mound with sides sloped to promote runoff.

Documents describing the layout and dimensions of the former reactor building, location of the buried reactor vessel, and detailed engineering information are sealed in stainless steel boxes that are secured in two locations at the site.

### **Ground Water Monitoring**

Depth to the regional water table at the reactor site is about 150 feet below ground surface, although zones of perched ground water are present at depths as shallow as 3 feet below ground surface.

In about 1990, the Nebraska Department of Health expressed concerns that shallow ground water at the site could potentially come in contact with radioactive materials buried along the subsurface walls of the former reactor building. DOE conducted soil and ground water investigations to characterize subsurface conditions at the site. Soil and ground water samples were scanned for gamma activity and analyzed for gross alpha, gross beta, nickel-63, and tritium. In 1997, DOE began collecting ground water samples annually from 17 monitor wells. No radioactivity has been detected above background concentrations in any samples collected to date, and there is no evidence that the reactor facility has had any effect on site soil or ground water.

### **Regulatory Setting**

DOE possesses the radioactive material at the Hallam site under the authority of the Atomic Energy Act of 1954 (Title 42 *United States Code* [U.S.C.] Section 2011). Ground water beneath the site complies with U.S. Environmental Protection Agency standards in the Clean Water Act (33 U.S.C. 1251, *et seq.*). The Nebraska Public Power District owns the 640-acre power station and controls access to the reactor site.

### **Legacy Management Activities**



*Hallam Site Intermediate Heat Exchanger Building (white building). Grassy area covers the belowground portion of the decommissioned reactor facility.*

DOE manages the Hallam Decommissioned Reactor Site according to a site-specific Long-Term Surveillance Plan to ensure that the massive concrete and steel entombment structure continues to prevent release of contaminants to the environment. Under provisions of this plan, DOE conducts annual inspections of the site to evaluate the condition of surface features, collects and analyzes ground water samples, and maintains the turf on the grass-covered mound and the exterior of the Intermediate Heat Exchanger Building. Through an agreement with the Nebraska Department of Health, DOE monitored site ground water through 2005. Because no radioactive contaminants have been detected since monitoring began, DOE will likely request concurrence from the State to discontinue monitoring and decommission the wells. Annual site inspections will continue.

### **Contacts**

Documents related to the Hallam Decommissioned Reactor Site and ground water monitoring results are available on the DOE Office of Legacy Management website at <http://www.LM.doe.gov/land/sites/ne/hallam/hallam.htm>.

For more information about DOE Office of Legacy Management activities at the Hallam Decommissioned Reactor Site, contact

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